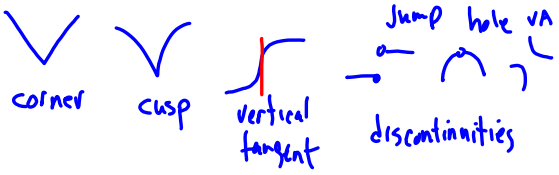
Review 3 Differentiability

$f(x)$ is differentiable means $f'(x)$ exists

NOT differentiable



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If $f(x)$ is differentiable then it is continuous

{ doesn't work the other way }

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Ex 1. $f(x)=\begin{cases} 3-x, & x<1 \\ ax^2+bx, & x\geq 1 \end{cases}$

a) Find the relation between a & b so that $f(x)$ is continuous at $x=1$

b) Find the values of a and b so that $f(x)$ is differentiable at $x=1$

a) lhl = rhl

$3-x = ax^2+bx$

$2=a+b$ ✓

b) $-1=2ax+b$

let $x=1$: $-1=2a+b$ ✓

lhd = rhd

$a+b=2$

$-(2a+b=-1)$

$-a=3$

$a=-3$

$b=5$

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Ex 2 $f(x)=\begin{cases} x^2, & x\leq 1 \\ 2x+1, & x>1 \end{cases}$

Is $f(x)$ diff. at $x=1$. Justify

lhd: $2x$ rhd: $\frac{x}{\infty}$ let $x=1$

$2=2$

Is $f(x)$ continuous NO lhl ≠ rhl $1 \neq 3$

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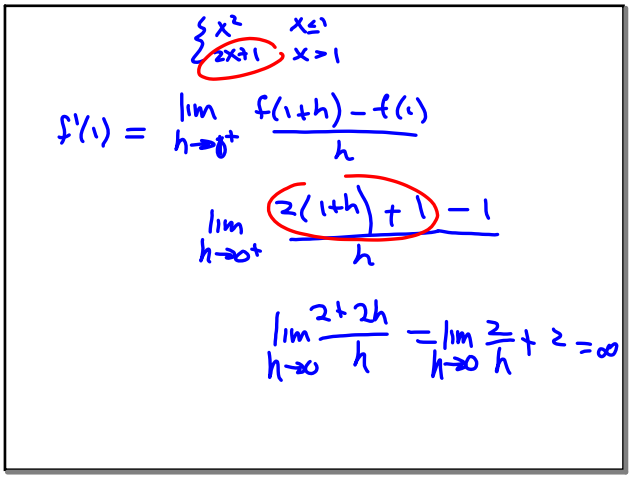

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